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Do self-referent metacognition and residential context predict depressive symptoms across late-life span? A developmental study in an Italian sample

Maria Chiara Fastame[a]*, Paul Kenneth Hitchcott[b] and Maria Pietronilla Penna[a]

[a]*Department of Pedagogy, Psychology, Philosophy, University of Cagliari, Cagliari, Italy;* [b]*Department of Psychology, Southampton Solent University, Hampshire, United Kingdom*

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Objectives: There is controversial evidence concerning the variables favoring depression in community-dwelling elderly individuals. This study mainly investigates the impact of lifestyle, residential environment, cognitive efficiency and social desirability in predicting self-assessed depressive signs in late adult span.
Method: One hundred forty-nine elders were recruited in Northern Italy and Sardinia – an Italian island characterized by the longevity of people living in the inner areas. Participants were presented a battery of questionnaires assessing cognitive efficiency and self-referent measures of depression, metacognition and social desirability.
Results: A hierarchical regression analysis showed that residential environment was the most effective predictor of depressive symptoms, along with gardening and spending time for hobbies. In contrast, social desirability and metacognitive scores played a minor role in predicting mental health. An analysis of variance showed that Sardinian elders showed fewer signs of depression than age-matched elders residing in Northern Italy.
Conclusion: The Sardinian residential environment is a strong predictor of preserved mental health in late adulthood. In contrast, self-rated metacognitive efficiency and social desirability play a very marginal role in predicting depression among the elderly.

Keywords: aging; metacognition; depression; predictors; social desirability; mental health; older adults

Introduction

The promotion of mental health in later life requires the investigation of those factors impacting the affective status and psychological well-being of elders, in order to isolate those variables threatening their life quality.

Significant previous research has been focused on the determination of the variables favoring depression in non-institutionalized elderly populations, in order to prevent its occurrence. However, this endeavor has yielded some inconsistent findings.

Relatively robust evidence indicates that marital status (i.e. being single, divorced or widow) (e.g. Yan, Huang, Wu, & Qin, 2011), cognitive decline (e.g. Paterniti, Verdier-Taillefer, Dufouil, & Alpérovitch, 2002), the occurrence of chronic medical conditions (Ostergaard & Foldager, 2011), as well as lower education (Ross & Mirowsky, 2006) and scarce physical activity favor the onset of depression among the elders (for a review, see Djernes, 2006). Regarding physical activity, Wang and MacMillan (2013) have noted that gardening provides important mental health benefits.

Similarly, a related line of research has explored the impact of self-referent measures of metacognition on depressed adults. As Flavell (1979) suggests, metacognition refers to the pool of knowledge, monitoring tendencies and expertise that individuals have relative to their cognitive functioning (i.e. knowing of knowing). In this regard, there is evidence that self-referent metacognitive measures predict anxiety and depression across the adult life span (e.g. Hjemdal, Stiles, & Wells, 2013; Spada, Mohiyeddini, & Wells, 2008). Indeed, Sheppard and Teasdale (2000) report that compared to controls, depressed patients possess a deficit in metacognitive monitoring of online processing functions. Nonetheless, the existence of a causal relationship between depressive signs and metacognition is debatable, not least because of the evidence that negative mood and education level predict general beliefs about memory functioning (i.e. metamemory) – which is a specific component of the metacognitive construct – across the adulthood (Fastame, 2014).

In contrast, varying findings have been reported concerning other predictors of mental health among the elderly. For example, whereas older females show greater depressive symptoms than males in some studies (e.g. Sonnenberg, Beekman, Deeg, & van Tilburg, 2001), this difference was not observed in other investigations (e.g. Snowdon & Lane, 1995).

Equally the role of residential environment in depression in late adulthood is unclear. Thus, according to Gao et al. (2009) depressive signs are greater among elderly people living in rural areas, because the access to mental health service is more difficult. In contrast, Carpiniello, Carta, and Rudas (1989) and Ganguli, Mulsant Richards, Stoehr, and Mendelsohn (1997) found the opposite pattern of results. This discrepancy may be significant inasmuch as it suggests residential environment is an important factor in

*Corresponding author. Email: chiara.fastame@unica.it

depression in the elderly. Specifically, Carpiniello and coworkers (1989) carried out a study in the rural and urban areas of an Italian region, namely Sardinia, which is known for the longevity of the inhabitants of the inner areas. As noted by the authors, the lower level of depression among Sardinian rural residents is perhaps, thanks to the greater and intense social support given by relatives and even neighbors in the inner villages of the isle. Very recently, Fastame, Penna, and Hitchcott (2014) found that older Sardinians from the rural and urban areas are less depressed that elderly people living in the agro-pastoral context located in Northern Italy and in a Sardinian urban area.

For the aims of the current investigation, such findings are especially relevant, because part of our data were collected in the inner Sardinian areas. In this regard, a very interesting cross-sectional survey carried out in Italy using the data provided by the Italian National Institute of Statistics suggests that elders residing in the South of Italy were significantly less likely to show a mental health index above the median value compared to people living in North West (de Belvis et al., 2008). Furthermore, the survey study points out that elderly people being involved in recreational or religious activities and socially bonded to relatives or neighbors showed superior mental health.

The resolution of inconsistencies within the literature requires diligent investigation because of the widespread use of subjective measures that can be biased by the tendency of people to 'fake' responses. In particular, individuals may desire to present themselves very favorably, that is, they can show the so-called socially desirable responding style (Paulhus, 1984). In support of this possibility, a study carried out by Fastame and Penna (2012) showed that social desirability can significantly impact self-rated measures of well-being (i.e. especially personal satisfaction), depression and metacognition efficiency in young and older healthy adults. This observation may be related to the aforementioned inconsistencies in findings based on the use of such measures.

The preliminary aim of this study was to investigate if there was a significant relationship between social desirability, metacognition and depressive signs across elderly people without cognitive impairment. However, the main goal was to explore the impact of metacognition, social desirability and environment of residence on a self-referent depression measure in late adulthood. Finally, the study was also aimed at exploring the effect of aging and environment on the depressive measure used.

In order to reach the abovementioned goals, participants were recruited in Northern rural Italy and in several Sardinian mountainous villages, because a recent study suggests that Sardinian older people living in the inner area of the province of Ogliastra self-reported better self-assessed well-being and lower depressive symptoms than elderly people resident in rural Lombardy (Fastame & Penna, 2013; Fastame, Penna, Rossetti, & Agus, 2014).

Overall, in agreement with previous research, for this study the following were hypothesized:

(1) Socially responding style will be significantly related to self-assessed metacognition efficiency and depression measures (Fastame & Penna, 2012).
(2) Self-rated metacognition score will predict depression in older adults (e.g. Hjemdal et al., 2013; Spada et al., 2008).
(3) Social desirability will be a significant predictor of depressive signs in late adulthood (Fastame & Penna, 2012).
(4) Environment of residence will contribute to predict self-rated depressive symptoms (Fastame, Penna, Rossetti, & Agus, 2014).
(5) Italian rural area of residence (i.e, Northern Italy vs. inner Sardinia) will impact mental health (Fastame Penna, & Hitchcott, 2014; Fastame, Penna, Rossetti, & Agus, 2014), that is, greater self-assessed depression will be expected among elders from Northern Italy than among the Sardinian ones.
(6) The oldest-old participants (i.e. aged more than 84 years old) will be expected to show greater signs of depression than younger elderly people (i.e. Gostynski, Ajdacic-Gross, Gutzwiller, Michel, & Herrman, 2002).

Method

Participants

One hundred forty-nine Italian elderly people living in their own house were recruited, respectively, in rural areas of Northern Italy (i.e. 71 participants) and in several Sardinian mountainous villages located in Barbagia and Gallura areas (i.e. 78 participants), where to our knowledge, so far, no studies on successful aging have been carried out. Participants were, respectively, assigned to the young-old (i.e. 65−74 years old), very-old (i.e. aged between 75 and 84 years) and oldest-old (i.e. >84 years old) groups. Furthermore, as suggested by Fastame and Penna (2012) to investigate the effect of the environment on depression scores, the volunteers were native-born, permanent residents of the villages in which they were tested and they had to be descendants of people originally from those areas for at least two previous generations. Finally, in order to take part in the study participants had to be cognitively intact, that is, they were initially screened by the Mini Mental State Examination (MMSE; Folstein, Folstein, & McHugh, 1975) and had to show a score ≥ 24. Table 1 provides the main socio-demographic information of the participants.

In agreement with De Beni, Borella, Carretti, Marigo, and Nava (2007), education level was dichotomized distinguishing a low level (i.e. ≤8 years) and a high one (i.e. >8 years).

Therefore, gender and educational level were counterbalanced across the participants ($\chi^2 = 0.51$, $df = 1$, $p = .82$ and $\chi^2 = 1.05$, $df = 1$, $p = .30$, respectively).

Overall, all contacted elders took part in the study, except five participants (i.e. three old participants resident in Northern Italy and two recruited in Sardinia) who were excluded from the study because they showed signs of cognitive decline.

Table 1. Socio-demographic characteristics collected from all the participants of the study. *SD* denotes standard deviation scores. Data are distinguished by age group (young-old, very-old and oldest-old) and geographical origin of the participants (Sardinia vs. Northern Italy).

		Young-old group (60−74 years)	Very-old group (75−84 years)	Oldest-old group (>84 years)
Sardinia	*n*	34	27	17
	Gender			
	Males	16	14	7
	Females	18	13	10
	Age (years)	$M = 70.1$ ($SD = 3$)	$M = 78.5$ ($SD = 3.2$)	$M = 86.9$ ($SD = 2.2$)
	Education (years)			
	≤8	17	17	11
	>8	17	10	6
Northern Italy	*n*			
	Gender	24	23	24
	Males	12	11	12
	Females	12	12	12
	Age (years)	$M = 70.7$ ($SD = 2.3$)	$M = 78.7$ ($SD = 2.9$)	$M = 87.4$ ($SD = 1.5$)
	Education (years)			
	≤8	12	10	12
	>8	12	12	12
	Total per age group	58	50	41

Materials

Each participant was presented the following battery of tools:

(1) A preliminary interview (Fastame & Penna, 2012) to collect information on socio-demographic characteristics and lifestyle (e.g. marital status, hobbies, time spent for leisure) of the participants.
(2) The MMSE (Folstein et al., 1975), which contains 30 questions assessing the general cognitive efficiency of the participants, that is, their spatial−temporal orientation, visual−motor integration, short and long-term memory, attention and mental calculation abilities, respectively. A score ≤ 23 was used as a cut-off to exclude participants with mild or severe cognitive decline.
(3) The Centre for Epidemiological Studies of Depression Scale (CES-D; Radloff, 1977; Italian version, Fava, 1983) is composed of 20 items assessing depressive signs experienced during the past week on a four-point Likert scale (from 0, *never or rarely* to 3, *most days or every day*). The maximum total score is 60, whereas a score ≥16 is used as the Italian cut-off to diagnose the presence of depressive symptoms. The internal consistency is expressed by Cronbach's alpha of .94 for the current sample.
(4) The Cognitive Failures Questionnaire (CFQ) (Broadbent, Cooper, Fitzgerald, & Parkes, 1982; Italian version, De Beni et al., 2007) is a metacognitive questionnaire self-assessing the frequency of mnestic or motor functions failures in the daily life during the past six months. Answers are expressed along a five-point Likert scale ranging from 0 (*never*) to 4 (*very often*). The tool is composed of 25 items; therefore, the maximum score is 100. A score ≥ 22.5 is used as the Italian cut-off to diagnose a significant self-referent metacognitive decline. Overall, this is a reliable tool as Cronbach's alpha of .88 illustrates.
(5) The Marlowe−Crowne Social Desirability Scale (MCSDS; Crowne & Marlowe, 1960; Italian version for old adults, Fastame & Penna, 2012) is a tool assessing the socially responding style, which is composed of 33 true and false items describing socially acceptable but unlikely behaviors and socially rejected but probable behaviors. The maximum total score is 33, whereas scores ≥ 23.39 and 27.14 are, respectively, used as the Italian cut-off to detect the socially desirable responding style in 65−74 and >75 year old adults, respectively. The reliability of the Italian version of this scale in the sample is expressed by Cronbach's alpha of ≥.59.

Procedure

After receiving a formal written informed consent, each participant was tested individually in a quiet room of his/her own house. Therefore, the MMSE was presented first in order to exclude the possible presence of signs of cognitive decline. Then, each respondent was presented the questions contained in the preliminary interview by Fastame and Penna (2012). Finally, the presentation order

of the further questionnaires was counterbalanced across the participants.

In order to minimize the impact of fatigue, the experimenter read aloud the statements of each questionnaire then wrote down the answer given by the respondent on the corresponding response sheet. If requested, a break could be interposed between the presentation of two questionnaires.

Each experimental session lasted about 60 minutes.

After the scoring phase, we planned to calculate two separate correlations with Pearson's method in order to investigate Hypothesis 1. After that, we decided to carry out a hierarchical linear regression analysis to verify Hypotheses 2, 3 and 4. Finally, to verify Hypotheses 4 and 5, we planned to carry out a between-subjects analysis of variance (ANOVA) that allowed us to explore the impact of age-related factors and the environment of residence on self-rated depression measure.

Results

In order to verify Hypothesis 1, Pearson product moment correlations were calculated in order to explore the relationship between CES-D and CFQ scores with the social desirability measure. Pearson's correlation index between depression and the socially desirable responding style was negative and statistically significant ($r = -.341$, $p < .0001$); therefore, the more participants tried to impress the experimenter the less they self-reported negative mood. Similarly, the Pearson product moment coefficient between the metacognitive and social desirability scores was negative and statistically significant ($r = -.17$, $p = .042$), that is, the more participants tried to impress, the less cognitive failures were declared in their daily life.

Then, to verify Hypotheses 2, 3 and 4, a hierarchical linear regression analysis was performed to explore whether the environment of residence (Sardinia vs. Northern Italy), physical health assessed in terms of assumption of medicines (*yes* vs. *no*), carrying out hobbies (*yes* vs. *no*), spending time for gardening or farming (*yes* vs. *no*), metacognitive and social desirability scores predicted CES-D measures. In the first step, the environment was inserted, in the second step, the tendency to have hobbies, to take medicines and spending time for gardening/farming were used, then in the third step, the CFQ score was inserted and finally in the last step, the social desirability index was used. Table 2 summarizes the outcomes.

Finally, a 2 (environment: Sardinia vs. Northern Italy) × 3 (age group: young-old vs. very-old and oldest-old age groups) ANOVA was carried out on the self-assessed depression measure in order to verify Hypotheses 4 and 5. The main effect of environment was statistically significant ($F(1, 143) = 77.69$, $p < .0001$, $\eta p^2 = .35$) where there was neither the main effect of age group ($F(2, 143) = 1.96$, $p = .14$) nor the interaction between environment and age group. ($F(2, 143) = 2.35$, $p = .10$). As expected, the depression score was lower among the Sardinian elders ($M = 8.83$, $SD = 6.52$) than among the Northern Italian ones ($M = 22.44$, $SD = 11.6$).

Discussion and conclusions

An extensive literature indicates that a wide range of factors regulate depression which, in turn, can impact massively the quality of life of the elderly (for a review, see Djernes, 2006).

The major goal of this study was to investigate the part played by environmental and metacognitive factors, together with lifestyle and socially desirable responding style, in predicting self-rated depressive signs in healthy-old, very-old and oldest-old adults.

Overall, the present investigation confirms and extends previous research concerning the factors influencing mental health in the elderly population. Specifically, our findings lead us to stress the importance of the residential environment in predicting depressive symptoms among the elderly. Indeed, it was found that 35% of the variance in the CES-D measure of our sample was explained by this factor. Participants recruited in rural Sardinian areas showed a very low level of depression,

Table 2. Predictors of a self-reported measure of depressive symptoms (CES-D) using environment (Sardinia vs. Northern Italy), assumption of medication (yes vs. no), leisure (yes vs. no), gardening/farming (yes vs. no), metacognitive (i.e. CFQ) and social desirability (i.e. MCSDS) scores as independent variables. This table displays only the significant variables impacting the depression measure.

Variable	*n*	Predictor	R^2 corrected	β	*t*	*p*
		Environment	.35	.59	8.94	<.0001
		Environment	.44	.62	9.97	<.0001
		Hobbies		−.201	−3.20	.002
		Gardening/farming		.22	3.48	.001
		Environment	.46	.59	9.69	<.0001
		Hobbies		−.17	−2.67	.009
CES-D	149	Gardening/farming		.21	3.40	.001
		CFQ		.17	2.72	.007
		Environment	.50	.56	9.45	<.0001
		Hobbies		−.15	−2.54	.012
		Gardening/farming		.21	3.51	.001
		CFQ		.14	2.35	.020
		MCSDS		−.21	−3.52	.001

both compared to elders living in Northern rural Italy and relative to the Italian cut-off index for the CES-D scale (i.e. ≥ 16). Overall, in our opinion, these outcomes are not surprising but also extend previous outcomes. Thus, in a recent study, Fastame, Penna, Rossetti, & Agus (2014) found that healthy elderly volunteers from the Sardinian province of Ogliastra – which is known for the longevity of its inhabitants – showed greater personal satisfaction and a more general subjective well-being than participants from the rural areas of Lombardy (i.e. Northern Italy). Further recent findings highlight that while affective problems have increased over the past two decades in many western countries, elders from Sardinia show fewer depressive disorders (Carta et al., 2012). As Carta et al. (2002) point out, this phenomenon seems to be related to the characteristics of the environment in which people reside, since Sardinian emigrants living in Paris, especially males, showed as many depressive symptoms as other Parisians. Various authors have noted that in Sardinia elders are more esteemed and more actively involved in their social context (Carpiniello et al., 1989; Fastame, Penna, Rossetti, & Agus, 2014), and are considered a valued resource for the transmission of local knowledge (Eller, 2011). Consequently, such environments will be more supportive and ready to play the role of scaffolding for elderly people. Conversely, environments in which the elderly are more sedentary and more socially isolated, such as rural Lombardy, are associated with higher levels of depression (Fastame, Penna, Rossetti, & Agus, 2014).

A further relevant finding emerging from this study is that being involved in leisure, as well as spending time for gardening/farming, contributes to preserved mental health in late adulthood. Indeed, we found that the lack of hobbies or not spending time in gardening or agriculture contributed 11% of the variance relative to the CES-D measure of our volunteers. This sort of outcome is also well documented in previous studies, such as those carried out by Chodzko-Zajko et al. (2009), Ostergaard and Foldager (2011) and Wang and MacMillan (2013). Moreover, Fastame, Penna, Rossetti, & Agus (2014) found that elderly people from rural Northern Italy were less physically active and less involved in socio-recreational and gardening activities than the participants from Ogliastra, with the former showing lower coping strategies and personal satisfaction.

On the basis of the present findings, one may conjecture that the residential environment plays an important role in promoting involvement in social and physical activities in elderly Sardinians. Consequently, one can also wonder whether the current findings can be generalized also to those living in urban areas, where the lifestyle can be different. As Carpiniello et al. (1989) state, while in Sardinian urban areas there are many opportunities in terms of spending time in social activities and sports, the level of social support from relatives and neighbors can be quite limited. It follows that a limit of this study is that we did not investigate the characteristics of the contexts in which data were collected in terms of the prevalence of collectivism/individualism values. That is, although the characteristics of the environment in which data were collected could have played a crucial role in terms of preservation of mental health among the Sardinian elderly, at present we cannot provide information on the type of values (i.e. collectivistic vs. individualistic) prevailing in Northern Italy and in the villages of Barbagia and Gallura in which data were collected. Thus, future research has to provide this sort of information, because if the greatest mental health among the Sardinian participants is related to the prevalence of collectivistic values as previous studies (e.g. Carpiniello et al., 1989; Carta, 2013; Fastame, Penna, & Hitchcott, 2014; Fastame, Penna, Rossetti, & Agus, 2014) seem to suggest, this can contribute massively in individuating further factors impacting mental health in late adulthood. Q6

Overall, if we consider that the environment of residence and the lack of leisure time spent in recreational activities and farming/gardening alone predict 44% of variance relative to the self-rated depression score of our sample, this leads us to highlight that the role of those factors in impacting the mental health of the elder people deserves to be studied more deeply in other socio-cultural contexts.

Metacognition is suggested to be a key factor (e.g. Hjemdal et al., 2013; Spada et al., 2008) strictly related to affective status in adulthood. Nonetheless, in this study, self-rated metacognitive efficiency measure only accounted for 2% of the variance relative to the CES-D measure. Therefore, one can wonder whether the emerging differences among the current and previous findings can be due to the choice of the tools used to assess self-rated metacognitive efficiency or to the characteristics of the samples recruited for the investigations.

However, in agreement with Fastame and Penna (2012), we found that socially desirable responding style is significantly related to metacognition and depression measures, but the former marginally biases the assessment of depression among the elders. Indeed, current findings showed that only 4% of the variance in CES-D measure is explained by the MCSDS score. Therefore, current outcomes are more consistent with those by Phillips, Henry, Hosie, and Milne (2006), according to which the social desirability of responding does not impact massively the self-assessment of well-being in older people. Furthermore, current results seem also to suggest that unlike older participants recruited in Ogliastra by Fastame and Penna (2012), our participants tended to give more honest answers, that is, the tendency to impress positively the experimenter about their own metacognive efficiency was less remarkable and, therefore, less impacting in our sample.

However, future research has to investigate perceived mental health among the elders in further Italian regions or foreign rural areas, in order to explore whether the good Sardinian quality of life among the elders is not an exception. Indeed, to our knowledge, given the heterogeneity of Italy even from a sociocultural perspective, cross-cultural comparisons among the level of perceived well-being, depression and metacognition and their relationship in different Italian areas have not been explored yet, if we exclude current and previous studies carried out in

Sardinia and Northern Italy (e.g. Fastame, Penna, Rossetti, & Agus, 2014). Similarly, to our knowledge, no studies have been carried out in order to compare mental health of elderly people living, for instance, in rural regions of the Mediterranean area, which, hypothetically can share several aspects of life style and perhaps some cultural values.

Moreover, this study was done in rural villages, where a very simple life style dominates; therefore, we cannot conclude that the best mental health found among Sardinian elders can be generalized also to the older population living in Sardinian urban areas. At present this can be hypothesized, because according to Carpiniello et al. (1989), people living in Sardinian rural areas are less depressed than people living in the Sardinian city of Cagliari.

In conclusion, this study has successfully extended previous research about the role of residential environment in preserving mental health in late adulthood. However, future studies have to investigate more deeply the role played by environment in favoring lower levels of depressive symptoms in late adulthood, in order to detect those factors empowering mental health amongst the elders and, therefore, their quality of life. Q7

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